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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:
J. Yong Ryu

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Atty. File: CDT 1792

Serial No.: 09/977,666

Group Art Unit: 1754

Filed: 10/15/01

Examiner: C.N. Ngyuen

FOR: Hydrogenation Catalyst and Hydrogenation Process

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

1. Transmitted herewith in triplicate is the APPEAL BRIEF in this application with respect to the Notice of Appeal filed on January 8, 2004.

2. STATUS OF APPLICANT

This application is on behalf of
☒ other than a small entity
☐ small entity

3. ☐ Applicant hereby petitions for an extension of time of (1) month for filing the Brief from the Notice of Appeal filed 09/17/03 as provided in 37 CFR 1.136 (a).

- ☐ a fee in the amount of \$
☐ is enclosed
☐ charge to Deposit Account No. 10-0740. (Duplicate notice enclosed.)
☐ fee previously paid

4. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 CFR 1.17(f) the fee for filing the Appeal Brief is:

- ☐ small entity \$165.00
☒ other than a small entity \$330.00

Appeal Brief due \$330.00

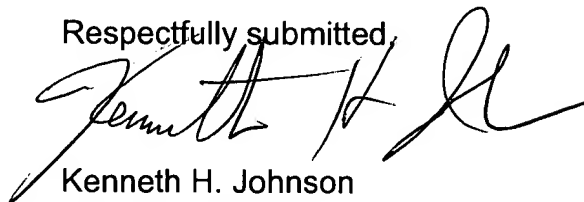
5. FEE PAYMENT

[X] Attached is a check in the sum of \$330.00

[] If any additional fee is required, charge Acct. No. 10-0740 .

This sheet is presented in duplicate.

Respectfully submitted,



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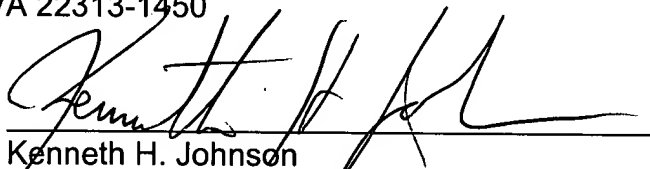
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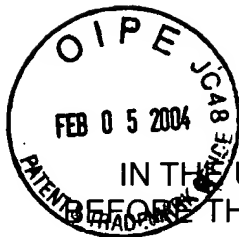
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on 02/02/04.



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BRIEF ON APPEAL

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I.

REAL PARTY IN INTEREST

The subject patent application is assigned of record to Catalytic Distillation Technologies. Therefore, the real party in interest is Catalytic Distillation Technologies

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RELATED APPEALS

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Claims 1-20 remain in the application. Claims 13-20 were withdrawn by the examiner(restriction, non elected claims). Claims 1-12 are on appeal and all are rejected.

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SUMMARY OF THE INVENTION CLAIMED ON APPEAL

The invention is a supported catalyst comprising (1) Pd or a Group 8 metal comprising Pd and one other Group 8 metal, preferably a Group 8 metal selected from Pt, Ir, Ru, Co or Ni, and (2) at least two metals selected from Ag, Zn or Bi, preferably Ag and at least one of Zn or Bi. Optionally the catalyst may contain K. The content of K in the catalyst is preferably less than 0.5% by weight. Preferably the support is highly porous having average pore diameter larger than about 180Å, no pores narrower than 35 Å, total pore volume larger than about 0.65 cc/g, and preferably less than about 100 m²/g BET

surface area. (Specification, page 4, lines 15-28)

VI. ISSUES

1. Are claims 1-7 and 9-12 anticipated by Frenzel U.S. patent 6,350,717 under 35 USC § 102 (e)?

2. Does Frenzel U.S. patent 6,350,717 make out a *prima facie* case of obviousness of claims 1-7 and 9-12?

3. Is claim 8 obvious over Frenzel U.S. patent 6,350,717 in view of Brown U.S. patent 6,127,310 under 35 USC § 103(a)?

VII. GROUPING OF CLAIMS

In view of the rejections as constituted in the final rejection, all of the claims are grouped together.

VIII. ARGUMENT

A. The Rejections

In the Final Office Action:

Claims 1-7 and 9-12 had been rejected under 35 USC § 102 (e) as being anticipated by Frenzel, U.S. patent 6,350,717.

Claim 8 had been rejected under 35 USC § 103(a) as being obvious over Frenzel, U.S. patent 6,350,717 in view of Brown U.S. patent 6,127,310.

Applicant respectfully traverses the rejections.

B. The Prior Art

Frenzel discloses that its catalyst must have "at least one" element from its group

10 (nickel, palladium or platinum) and "at least one" element from its group 11 (copper, silver and gold).

Brown discloses that bismuth may be enhance the performance of a palladium hydrogenation catalyst.

C. Issues

1. ARE CLAIMS 1-7 AND 9-12 ANTICIPATED BY FRENZEL U.S. PATENT 6,350,717 UNDER 35 USC § 102 (E)?

Rejections under Section 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art. See *In re Arkley et al.*, 172 USPQ 524(CCPA 1972). A rejection under 35 USC 102(e) for anticipation necessarily implies that the invention sought to be patented is not new, i.e., that there are no differences between what is claimed and what is disclosed in the prior art. See *In re Kalm*, 154 USPQ 10 (CCPA 1967). The cited art quite clearly does not disclose that which the examiner urges in the Office Action that it does disclose. Further the test that determines whether the reference is anticipatory or not is whether the reference contains an enabling disclosure. See *In re Hoeksema*, 158 USPQ 596 (CCPA 1968). As pointed out hereinabove, this reference does not contain enabling disclosure since it is not directed to the same invention. All disclosures in a reference must be evaluated for what they fairly teach one of ordinary skill in the art. See *In re Unbricht*, 160 USPQ 15 (CCPA 1968). Hence when one considers the specific disclosure of the prior art the case which the examiner urges for anticipation is completely destroyed.

Frenzel discloses that its catalyst must have "at least one" element from its group

10 (nickel, palladium or platinum) and "at least one" element from its group 11 (copper, silver and gold). The term "at least one" is not a disclosure of more than one, it merely does not preclude another metal from the group in question.

The present claims **require**:

Pd and at least **2** metals selected from Ag, Zn or Bi

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Pd and **one other Group 8 metal** and at least **2** metals selected from Ag, Zn or Bi

Frenzel **requires** only at least one New Group 10 metal(Ni, Pd, Pt) and one New Group 11 metal(Cu, Ag, Au). The required metals of Frenzel do not include either Zn or Bi (at least one of must be present in addition to Ag for the present invention), thus the compositions as disclosed by Frenzel cannot be the same as the present invention. The fact that Frenzel discloses that other elements **may be** added to the catalysts fails to create a 102 disclosure and in the absence of suggestion that these other elements are essential or should be added for a selective hydrogenation catalyst, that very general disclosure is not sufficient to support obviousness. Thus it should be noted that the Frenzel disclosure prefers only one metal from each of its 2 groups and does not enable one of ordinary skill to practice the invention as claimed (i.e., no enabling disclosure).

With regard to claim 12, the examiner's statement about the apparent bulk density is in error. The bulk density is a function of the shape of the support as well as the properties of the alumina. The shape (not claimed) which applicant's discloses is spherical while the catalyst of Frenzel is extruded -- which may be many long shapes (lobed, cylindrical, etc) but not spherical.

Thus, applicant's claims are not anticipated by Frenzel. A reference, to be anticipatory under § 102, must meet every critical element of the claim at issue. That is, each element of a claim under consideration must be found in a single prior art reference. *Lindemann Maschinenfabrik, GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

Because Frenzel does not teach multiple elements from his group 10 and 11 and further specifically teaches only one, the reference cannot make the instant claims obvious under 35 USC § 103. The CAFC in *In re Gurley*, 31 USPQ2d 1130 (Fed. Cir. 1994) has summarized the "teaching away" line of reasoning. Therein at page 1131 the court held that "a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant."

The examiner has "noted" the failure of Frenzel to disclose all of the elements of the present claimed invention (final, page 7) is a *defacto* admission that the reference is not anticipatory and the rejection must fail. The examiner's position that the applicant must provide some reason why the omitted element(s) cannot be added by a person of ordinary skill. There is no support for this view even in regard to 103 let alone 102. Silence in a reference is not a proper substitute for an adequate disclosure of facts. *In re Burt*, 148 USPQ 548 (CCPA 1966).

Further, it is a well known patent law concept that catalysis is not predictable. See *Ex parte Levine, et al.*, 41 USPQ 411 (Bd. App. 1939); *Ex parte Berger, et al.*, 108 USPQ 236 (Bd. App. 1953), *In re Doumani, et al.*, 126 USPQ 408 (CCPA 1960).

The reasoning that elements are in the same Periodic Table group and thus obvious

has been specifically rejected by the CAFC in *In re Grasselli and Hardman*, 218 USPQ 769 (Fed. Cir. 1983) wherein the Court held:

"...,the known relationship of lithium, cesium, rubidium and francium to sodium and potassium, as Group IA elements, is not sufficient, in and of itself, to treat them as interchangeable in catalyst compositions." [emphasis by Court].

Thus, claims 1-7 and 9-12 are also not obvious over Frenzel.

2. DOES FRENZEL U.S. PATENT 6,350,717 MAKE OUT A *PRIMA FACIE* CASE OF OBVIOUSNESS OF CLAIMS 1-7 AND 9-12?

It is well settled that a rejection based on § 103 must rest upon a factual basis rather than conjure or speculation. "Where the legal conclusion of [of obviousness] is not supported by the facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967); see also *In re Sporck*, 301 F.2d 686, 690, 133 USPQ 360,364 (CCPA 1962). "Obviousness cannot be established by combining teachings of the prior art to produce the claimed invention, *absent* some teaching suggestion or incentive supporting the combination." *In re Geiger*, 2 USPQ2d 1276 (CAFC 1987). Hence, without the requisite teaching, suggestions or incentives there is no *prima facie* case and the rejection must fail. The court was addressing piecemeal combination of teachings, which could be argued met the claims, however, there is no proposed combination, and thus does not even meet the claims of the present invention and does not even rise to the level of putative *prima facie* case. See also *In re Fine*, 5 USPQ2d 1596 and *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993).

It is the examiner's position that the applicant is required to show why an element which is not mentioned should not be considered included. "A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided by the prior art references and the then-accepted wisdom in the field." *In re Kotzab*, 217 F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). When one considers the rejection in this light, there is no evidence to support the rationale as advanced by the examiner. There is no incentive from Frenzel to include Bi.

It is not obvious to employ the recited element(s) because there is no teaching or suggestion to combine them. References (or in this case no references) are not properly combined if there is no suggestion therein that they should or could be combined, absent applicant's disclosure. *Ex parte Lennox*, 144 USPQ 224; *In re Stephens, et al.*, 145 USPQ 656; *Ex parte McKay*, 147 USPQ 220; *In re Pye, et al.*, 148 USPQ 426; *In re Imperato*, 179 USPQ 730. See also *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993). In the present situation the record contains no evidence of a motivation, the mere assertion that the modification of Frenzel composition is to add promoters found within Frenzel, however this overlooks the fact that neither one of the required elements, Ag or Bi, are disclosed within Frenzel.

3. IS CLAIM 8 OBVIOUS OVER FRENZEL U.S. PATENT 6,350,717 IN VIEW OF BROWN U.S. PATENT 6,127,310 UNDER 35 USC § 103(A)?

The only additional disclosure of Brown is that bismuth may enhance the performance of a palladium catalyst, not just any hydrogenation catalyst as the examiner

has proposed. The catalyst of Brown is specific and the use of bismuth is specific to that catalyst, which on consideration of the entire disclosure is a catalyst in which Pd is the primary active ingredient. As outlined above, the law has long recognized that catalysis is unpredictable. One cannot merely plug one element in for another or one "enhancer" from one catalyst in another and achieve predictable results. See *In re Geiger, supra*.

In an even more compelling line of cases it is well established that references are not properly combined if there is no suggestion therein or no evidence that those skilled in the art would select the art that they should or could be combined absent applicant's disclosure *Micro Chemical Inc. v. Great Plains Chemical Co.*, 41 USPQ2d 1238, 1244 (fed. cir. 1997); *In re Imperato*, 179 USPQ 730 (CCPA 1973); *In re Pye, et al.*, 148 USPQ 426 (CCPA 1966); *In re Stephens, et al.*, 145 USPQ 656 (CCPA 1965); *Ex parte McKay*, 147 USPQ 220 (BdPatApp 1965); *Ex parte Lennox*, 144 USPQ 224 (BdPatApp 1965). See also *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993). It is submitted that the combination as proposed by the examiner is based on the applicant's motivation to make the claimed invention rather than any suggestion in the references. Thus, it is not obvious to employ the recited steps because there is no teaching or suggestion to combine any step from one cited reference with any other step of another reference.

Thus, the broadest teaching of the disclosures of the applied art, individually or combined, are a supported palladium-silver catalyst with perhaps a promoter and a second catalyst which comprises palladium enhanced by bismuth. This does not anticipate or make obvious the claimed catalyst.

D. Conclusion

In summary, claimed invention catalyst requires **Pd** and at least **2** metals selected from Ag, Zn or Bi or **Pd** and **one other Group 8 metal** and at least **2** metals selected from Ag, Zn or Bi. Frenzel does not disclose (mention) either Ag or Bi and the proposed combination with Brown is inappropriate to make out a prima facie of obviousness of the claimed compositions.

Applicants respectfully request that the board reverse the examiner.

Respectfully Submitted,



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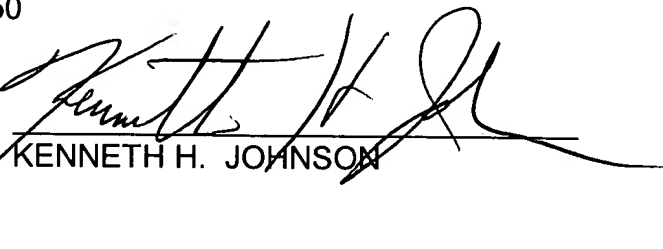
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KENNETH H. JOHNSON

IX. APPENDIX

A. CLAIMS ON APPEAL

1. A supported catalyst for the selective hydrogenation of unsaturated compounds comprising (1) Pd or a Group 8 metal component comprising Pd and one other Group 8 metal and (2) at least two metals selected from the group consisting of Ag, Zn and Bi.

2. The catalyst according to claim 1 comprising a group 8 metal component comprising Pd and one other Group 8 metal.

3. The catalyst according to claim 2 wherein said Group 8 metal is selected from the group consisting of Pt, Ir, Ru, Co and Ni.

4. The catalyst according to claim 1 comprising Ag and at least one of Zn or Bi.

5. The catalyst according to claim 1 wherein said catalyst is supported on a support which is highly porous having average pore diameter larger than about 180Å, no pores narrower than 35 Å, total pore volume larger than about 0.65 cc/g, and BET surface area less than about 100 m²/g.

6. The catalyst according to claim 1 comprising K.

7. The catalyst according to claim 1 wherein Pd is in the range of 0.005 to 1% by weight; Ni is in the range of 0.0 to 15% by weight; Ag is in the range of 0.002 to 20% by weight; Zn is in the range of 0 to 5% by weight and Bi is in the range of 0 to 5% by weight.

8. The catalyst according to claim 1 wherein Pd is in the range of from 0.01% to 0.3% by weight; Ni is in the range of from 0 to 10% by weight; Ag is in the range of 0.005 to 5% by weight; Zn is in the range of 0.002 to 1% by weight and Bi is in the range of 0.01 to 3% by weight.

9. The catalyst according to claim 6 wherein the content of K is less than 0.5 % by weight.

10. The catalyst according to claim 5 wherein said support is alumina having a BET surface area of 10 to 100 m²/g.

11. The catalyst according to claim 10 wherein said support has a BET surface area of 20 to 70 m²/g.

12. The catalyst according to claim 5 wherein said alumina support comprises shaped transition alumina having an apparent bulk density of between 0.7-0.8 g/cm³ and having mixed crystalline forms of α , κ , θ , δ , ρ , η , γ , and χ .



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It is well settled that a rejection based on § 103 must rest upon a factual basis rather than conjecture or speculation. "Where the legal conclusion of [of obviousness] is not supported by the facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967); see also *In re Sporck*, 301 F.2d 686, 690, 133 USPQ 360,364 (CCPA 1962). "Obviousness cannot be established by combining teachings of the prior art to produce the claimed invention, *absent* some teaching suggestion or incentive supporting the combination." *In re Geiger*, 2 USPQ2d 1276 (CAFC 1987). Hence, without the requisite teaching, suggestions or incentives there is no *prima facie* case and the rejection must fail. The court was addressing piecemeal combination of teachings, which could be argued met the claims, however, there is no proposed combination, and thus does not even meet the claims of the present invention and does not even rise to the level of putative *prima facie* case. See also *In re Fine*, 5 USPQ2d 1596 and *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993).

It is the examiner's position that the applicant is required to show why an element which is not mentioned should not be considered included. "A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention, to consider the thinking of one of ordinary skill in the art, guided by the prior art references and the then-accepted wisdom in the field." *In re Kotzab*, 217 F.3d 1365, 1369-70, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). When one considers the rejection in this light, there is no evidence to support the rationale as advanced by the examiner. There is no incentive from Frenzel to include Bi.

It is not obvious to employ the recited element(s) because there is no teaching or suggestion to combine them. References (or in this case no references) are not properly combined if there is no suggestion therein that they should or could be combined, absent applicant's disclosure. *Ex parte Lennox*, 144 USPQ 224; *In re Stephens, et al.*, 145 USPQ 656; *Ex parte McKay*, 147 USPQ 220; *In re Pye, et al.*, 148 USPQ 426; *In re Imperato*, 179 USPQ 730. See also *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993). In the present situation the record contains no evidence of a motivation, the mere assertion that the modification of Frenzel composition is to add promoters found within Frenzel, however this overlooks the fact that neither one of the required elements, Ag or Bi, are disclosed within Frenzel.

3. IS CLAIM 8 OBVIOUS OVER FRENZEL U.S. PATENT 6,350,717 IN VIEW OF BROWN U.S. PATENT 6,127,310 UNDER 35 USC § 103(A)?

The only additional disclosure of Brown is that bismuth may enhance the performance of a palladium catalyst, not just any hydrogenation catalyst as the examiner

has proposed. The catalyst of Brown is specific and the use of bismuth is specific to that catalyst, which on consideration of the entire disclosure is a catalyst in which Pd is the primary active ingredient. As outlined above, the law has long recognized that catalysis is unpredictable. One cannot merely plug one element in for another or one "enhancer" from one catalyst in another and achieve predictable results. See *In re Geiger, supra*.

In an even more compelling line of cases it is well established that references are not properly combined if there is no suggestion therein or no evidence that those skilled in the art would select the art that they should or could be combined absent applicant's disclosure *Micro Chemical Inc. v. Great Plains Chemical Co.*, 41 USPQ2d 1238, 1244 (fed. cir. 1997); *In re Imperato*, 179 USPQ 730 (CCPA 1973); *In re Pye, et al.*, 148 USPQ 426 (CCPA 1966); *In re Stephens, et al.*, 145 USPQ 656 (CCPA 1965); *Ex parte McKay*, 147 USPQ 220 (BdPatApp 1965); *Ex parte Lennox*, 144 USPQ 224 (BdPatApp 1965). See also *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993). It is submitted that the combination as proposed by the examiner is based on the applicant's motivation to make the claimed invention rather than any suggestion in the references. Thus, it is not obvious to employ the recited steps because there is no teaching or suggestion to combine any step from one cited reference with any other step of another reference.

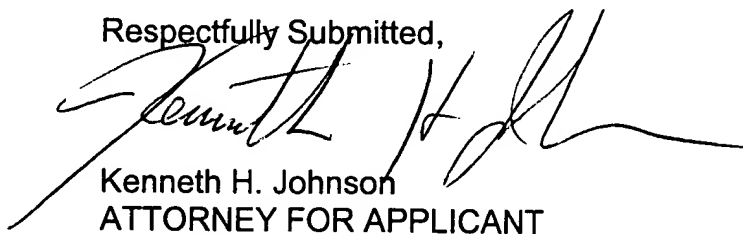
Thus, the broadest teaching of the disclosures of the applied art, individually or combined, are a supported palladium-silver catalyst with perhaps a promoter and a second catalyst which comprises palladium enhanced by bismuth. This does not anticipate or make obvious the claimed catalyst.

D. Conclusion

In summary, claimed invention catalyst requires **Pd** and at least **2** metals selected from Ag, Zn or Bi or **Pd** and **one other Group 8 metal** and at least **2** metals selected from Ag, Zn or Bi. Frenzel does not disclose (mention) either Ag or Bi and the proposed combination with Brown is inappropriate to make out a prima facie of obviousness of the claimed compositions.

Applicants respectfully request that the board reverse the examiner.

Respectfully Submitted,



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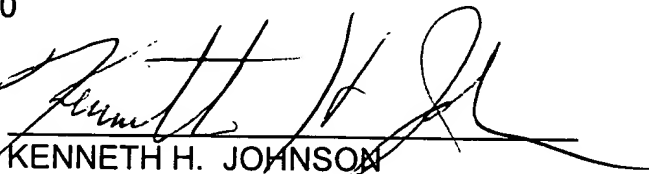
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KENNETH H. JOHNSON

IX. APPENDIX

A. CLAIMS ON APPEAL

1. A supported catalyst for the selective hydrogenation of unsaturated compounds comprising (1) Pd or a Group 8 metal component comprising Pd and one other Group 8 metal and (2) at least two metals selected from the group consisting of Ag, Zn and Bi.

2. The catalyst according to claim 1 comprising a group 8 metal component comprising Pd and one other Group 8 metal.

3. The catalyst according to claim 2 wherein said Group 8 metal is selected from the group consisting of Pt, Ir, Ru, Co and Ni.

4. The catalyst according to claim 1 comprising Ag and at least one of Zn or Bi.

5. The catalyst according to claim 1 wherein said catalyst is supported on a support which is highly porous having average pore diameter larger than about 180Å, no pores narrower than 35 Å, total pore volume larger than about 0.65 cc/g, and BET surface area less than about 100 m²/g.

6. The catalyst according to claim 1 comprising K.

7. The catalyst according to claim 1 wherein Pd is in the range of 0.005 to 1% by weight; Ni is in the range of 0.0 to 15% by weight; Ag is in the range of 0.002 to 20% by weight; Zn is in the range of 0 to 5% by weight and Bi is in the range of 0 to 5% by weight.

8. The catalyst according to claim 1 wherein Pd is in the range of from 0.01% to 0.3% by weight; Ni is in the range of from 0 to 10% by weight; Ag is in the range of 0.005 to 5% by weight; Zn is in the range of 0.002 to 1% by weight and Bi is in the range of 0.01 to 3% by weight.

9. The catalyst according to claim 6 wherein the content of K is less than 0.5 % by weight.

10. The catalyst according to claim 5 wherein said support is alumina having a BET surface area of 10 to 100 m²/g.

11. The catalyst according to claim 10 wherein said support has a BET surface area of 20 to 70 m²/g.

12. The catalyst according to claim 5 wherein said alumina support comprises shaped transition alumina having an apparent bulk density of between 0.7-0.8 g/cm³ and having mixed crystalline forms of α , κ , θ , δ , ρ , η , γ , and χ .